1. Solve equation \( e^y \frac{dy}{dx} = x^{1/2} \) (total 3 points).
   Answer: \( y = \ln(\frac{2}{3} x^{3/2} + C) \) (2 points for \( e^y = \frac{2}{3} x^{3/2} + C \); and 1 point for the correct final step.)

2. Evaluate \( \int \frac{dx}{x(\log_5 x)} \) (total 4 points).
   Answer: \( \ln 5 \cdot \ln |\ln x| + C \)
   (2 points for \( \ln 5 \cdot \int \frac{1}{\ln x} d\ln x \); 2 points for correct final result)

3. The physical law for the radioactive decay of C\(^{14}\) mass (\( y \)) over time (\( t \)) is given by
   \[
   \frac{dy}{dt} = -ky,
   \]
   where \( k > 0 \) is a constant. The initial C\(^{14}\) mass is \( y_0 \) and half-life of C\(^{14}\) mass is 5700 years. What is the age of a sample in which 80% of the original C\(^{14}\) mass has decayed (total 3 point)?
   Answer: \( t = -\frac{5700}{\ln 2} \ln 0.2 \)
   (1 point for \( y = y_0 e^{-kt} \); 2 points for correct final result)